PROC. BIOL. SOC. WASH.
104(3), 1991, pp. 474–492

STUDIES OF NEOTROPICAL CADDISFLIES, XLVI: THE TRICHOPTERA OF THE RÍO MOCHE BASIN, DEPARTMENT OF LA LIBERTAD, PERU

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Abstract.—Twenty-four species are recorded from the Río Moche (primarily) and Río Saña basins of northwestern Peru. The climatological, chemical, and life zone characteristics of the Río Moche are discussed. Six species are described as new: *Chimarra* (*C.*) *dolabrifera, C.* (*Curgia*) *otuzcoensis, Smicridea* (*Rhyacophylax*) *bidactyla, Hydroptila sicilicula, Neotrichia riparia,* and *Triaenodes peruanus.* The trichopterous fauna of this region is basically one of widespread species, some known from the U.S.A. to Chile.

The trichopterous fauna of Peru, the third largest country in South America, is very poorly known. There have been very few studies dealing exclusively with Peru, and these are limited to very restricted portions (Martynov 1912; Roback 1966; Flint 1975, 1980), thus most Peruvian records are scattered throughout the literature. Reyes has compiled a list of 107 species recorded from Peru (including those newly reported in this paper), which is certainly but a small fraction of the number of species that must occur there. Essentially nothing has been recorded from the coastal and immediately adjacent montane zones of northern Peru. This is the first report on the Trichopterous fauna that may be expected in other such suitable sites in these dry regions of western South America. Material on which this study is based is deposited in the National Museum of Natural History (NMNH), Washington and the Museo de Historia Natural "Javier Prado," Lima, Peru.

Río Moche Basin

The Río Moche basin is wholly located in the Department of La Libertad on the northwestern coast of Peru, the river entering the Pacific Ocean just south of Trujillo, its capital (Fig. 1). The drainage basin is about 96 km deep, widening to about 25 km at the ocean, and covering 2708 square km. It is situated between parallels 7°46′ and 8°15′ South and between meridians 78°16′ and 79°08′ West.

The river itself is 102 km long with an average gradient of 4% (this and the following information is extracted primarily from Anonymous 1973, 1987). Its origin is in the Laguna Grande at 3988 m elevation, near the town of Quiruvilca in the Province of Santiago de Chuco, from which it flows through the Provinces of Otuzco and Trujillo (Fig. 2). Just below the town of Simbal, at 576 m, it is joined by the Río Sinsicap, which originates above the village of Sinsicap at over 3000 m. Most of the collections were made in the portion of the Río Sinsicap between Simbal and the junction with the Río Moche. This section of the river is called by local inhabitants the Río Lucumar (Figs. 3, 4) and it divides into several arms, which reunite near the village of Cumbray at which point it takes the name of Cumbray Creek (Figs. 5, 6) and serves as the laundry area for the small village.

The rains in the basin are concentrated from January to April, with the driest period from June to September. The average

[1] Please see postscript.

Fig. 1. Map showing the placement of the Río Moche basin (stippled) in the Department of La Libertad, its provincial subdivisions and its position in Peru.

annual rainfall in the littoral is about 10 mm, rising perhaps to 100 mm at Simbal (average annual rainfall at nearby Samne, 1450 m is 162 mm), and to near 1500 mm at the river's origin (average annual rainfall at Quirivilca is 1389 mm). During low water flow the Río Lucumar near Simbal is 1–1.5 m wide by 30–50 cm deep (Fig. 3), increasing to 2.5 m by 50–70 cm in the rainy season (Fig. 4). The Cumbray Creek section is a bit larger, in the dry season 1.5 m by 50 cm (Fig. 5) but 3 m by 60–80 cm in the wet (Fig. 6). Much of the water of the lower Río Moche is diverted for irrigation, but at Puente Moche the river still runs 3–4 m by 50–80 cm in the dry season and 12–15 m by 1 m in the rainy season. An analysis of the water of Cumbray Creek gives a pH of 7.5, conductivity of 0.78 mmhos/cm, sum of cations 9.2 meq/l (Ca 4.2, Mg 2.6, Na 2.4, K 0.05), sum of anions 9.2 meq/l (CO_3 0, HCO_3 3.5; NO_3 0, SO_4 4.5, Cl 1.2).

The Río Moche over its course passes through five Holdridge life zones (Tosi 1960). It arises in "pradera muy húmeda montano (pmh-M)" which has an annual rainfall of 1000–1400 mm, passing at approximately 3700 m into the "pradera hú-

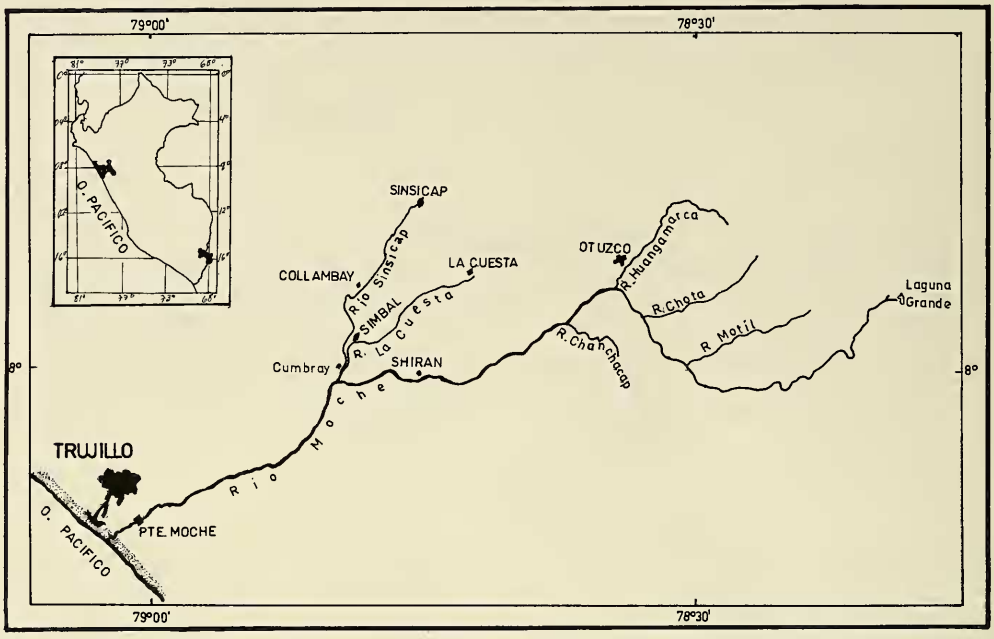
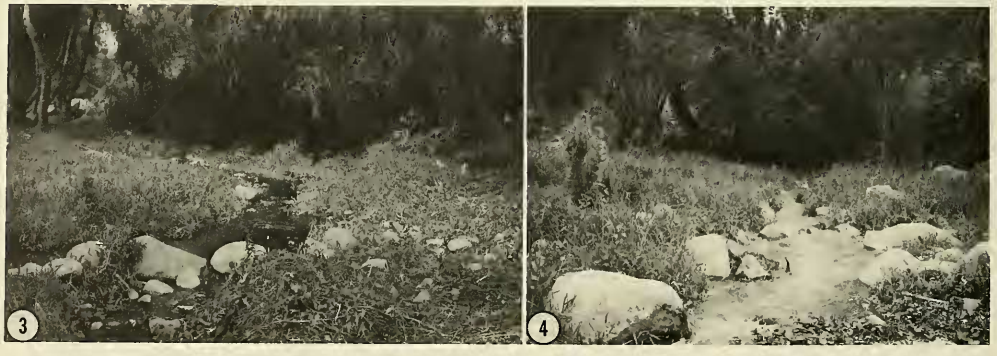


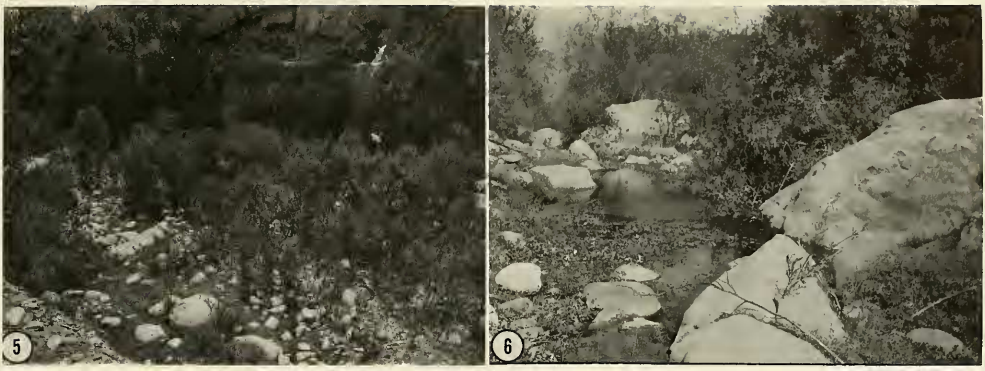
Fig. 2. Details of the Río Moche, its tributaries and principal towns.

meda montano (ph-M)" which lies in an annual rainfall regime of 500–1000 mm. Between elevations of 1600–2800 m, with annual rainfalls in the range of 200–500 mm the river flows in the "estepa espinoso montano-bajo (ee-MB)" zone. In the zone of Simbal and Cumbray Creek, where most of the collections were made, at elevations of 500–1800 m and rainfalls of 50–200 mm the life zone is denoted as "matorral desértico pre-montano (md-PM)." Puente Moche is situated below this zone in the "desierto pre-montano (d-PM)," which runs to the mouth of the river with rainfall between 0–50 mm.

The streamside vegetation at Cumbray Creek is dominated by *Baccharis* sp. (Fig. 5), with other typical plants of this zone: *Cereus macrostibas, Cereus candelaris, Capparis* sp., and *Caesalpinia* sp. Typical plants of the coastal zone are: *Capparis* spp., *Crytocarpus* sp., *Acacia macracantha,*



Figs. 3–4. Río Lucumar, near Simbal, site of the collections of *Triaenodes peruanus*: 3, dry season, June 1988; 4, wet season, January 1989.



Figs. 5–6. Cumbray Creek section, near Cumbray: 5, dry season, showing *Baccharis* the principal component of the flora, June 1988; 6, wet season, January 1989.

Arundo donax, Ginerium oleander, Schinus molle, Tessaria integrifolia, Baccharis sp. and *Ludwigia* sp.

Distribution

Figure 7 shows the known distributions of the twenty-four species of Trichoptera taken in this survey that could be specifically determined. Four of the species are recorded only from the Río Moche basin, while three additional species are known with certainty only from adjacent Ecuador or Peru. However, the majority are distributed into Central America, Mexico or even to the U.S.A. or the West Indies and a few are also known to live as far south as Argentina or Chile.

Thus, it seems that the somewhat depauperate trichopterous fauna of the Río Moche Basin, at least up to 500–600 m, is one with most species having a wide distribution in Central America and northern South America. We predict that the apparently endemic species will be found to exist as far north as Ecuador and south perhaps to central Peru, if not farther. The fauna here reported will probably be found in similar coastal river systems between central Ecuador and central Peru.

Family Hydrobiosidae
Atopsyche species 1

This is a very large genus of over 100 described species, limited exclusively to the Americas, including the Greater Antilles and the southwestern United States. Nine species have been recorded from Peru, but undoubtedly many more will be found with more extensive collecting. The cleared genitalia of the examples taken in this survey reveal two very distinctive species, but they cannot be specifically identified as males are lacking.

Species 1 is known only from larvae and a female metamorphotype, thus its wing length and general coloration are unknown.

Species \ Dist.	U.S.A.	Mexico	Cent. Amer.	Colombia	Venezuela	W. Indies	Ecuador	Saña/Moche	Peru	Argentina	Chile
Protoptila tojana		x	x				x	x	x		
Protoptila orotina				x				x			
Chimarra dolabrifera							x	x			
Chimarra emima			x	x			x	x			
Chimarra otuzcoensis								x			
Polycentropus joergenseni				x	x		x	x	x	x	
Smicridea bivittata		x	x	x	x		x	x			
Smicridea saucia								x	x		
Smicridea murina			x	x			x	x	x	x	x
Smicridea bidactyla					?		x	x			
Zumatrichia palmara			x				x	x			
Hydroptila constricta		x	x	x				x			
Hydroptila ditalea		x				x	x	x			
Hydroptila grenadensis			x	x		x	x	x			
Hydroptila sicilicula								x			
Neotrichia riparia								x			
Neotrichia gotera								x		x	
Ochrotrichia tenanga		x	x		x			x			
Ochrotrichia malada				x				x			
Oxyethira parce	x	x	x	x	x		x	x	x	x	
Nectopsyche spiloma	x	x	x				x	x			
Nectopsyche punctata		x	x	x	x		x	x	x	x	
Triaenodes peruanus								x			
Helicopsyche vergelana		x	x	x	x			x			

Fig. 7. Known distributions of the identified species of caddisflies collected in the Río Moche and Río Saña basins.

The general body size of the pupa would indicate that it is quite a bit smaller than the following species, perhaps with a forewing length of only 10 mm.

Material.—Peru, Dept. La Libertad, Prov. Trujillo, Dist. Simbal, Río Lucumar-Cumbray Creek, 17 Sep 1989, L. Reyes A., 2 larvae, 3 prepupae, 3 pupae, 1 ♀ metamorphotype.

Atopsyche species 2

This species, only known from a single female, has a forewing length of 13 mm and a dark coloration.

Material.—Peru, Dept. La Libertad, Prov. Otuzco, Dist. Otuzco, Río Pollo, Otuzco, 2620 m, 1 Jul 1989, L. Reyes A., 1 ♀.

Family Glossosomatidae

Protoptila tojana Mosely

Protoptila tojana Mosely, 1954:331.—Flint, 1963:476.—Maes & Flint, 1988:2.

The species was described from southern Mexico, and recorded from Honduras, Nicaragua, Costa Rica and Lima, Peru, thus exhibiting the greatest known range of any species in the genus. There is additional material from Guatemala, El Salvador, Panama and Ecuador in the NMNH. Its presence in northern Peru is, therefore, not surprising. In addition to the adults, larvae, pupae, and male and female metamorphotypes have been taken.

Material.—Peru, Dept. La Libertad, Prov. Trujillo, Dist. Simbal, Río Lucumar, Simbal, 11–12 Dec 1987, L. Reyes A., 4 ♂; 24 Jun 1988, 3 ♂, 1 ♀; 6 Jul 1989, 14 ♂, 1 ♀; 22 Jul 1989, 29 ♂, 2 ♀; 5 Sep 1989, 5 ♂. Río Lucumar, Cholocar, 17 Sep 1989, 1 ♂. Río Lucumar-Cumbray Creek, 15 Apr 1988, 1 ♂. Dist. Laredo, Río Moche, Conache, 28 Jul 1989, 6 ♂, 4 ♀. Dist. Moche, Río Moche near Puente Moche, 18 Jul 1989, 6 ♂, 4 ♀. Dept. Lambayeque, Río Saña, Oyotún, 200 m, 18 Nov 1989, 7 ♂.

Protoptila orotina raposa Flint

Protoptila orotina raposa Flint, 1974a:13.

This subspecies was described from the wet Pacific coast of Colombia; this is the second known occurrence of the subspecies. The nominate subspecies is found widely along the drier Pacific coast of Costa Rica and Panama.

Material.—Peru, Dept. Lambayeque, Río Saña, Oyotún, 200 m, 18 Nov 1989, L. Reyes A., 9 ♂.

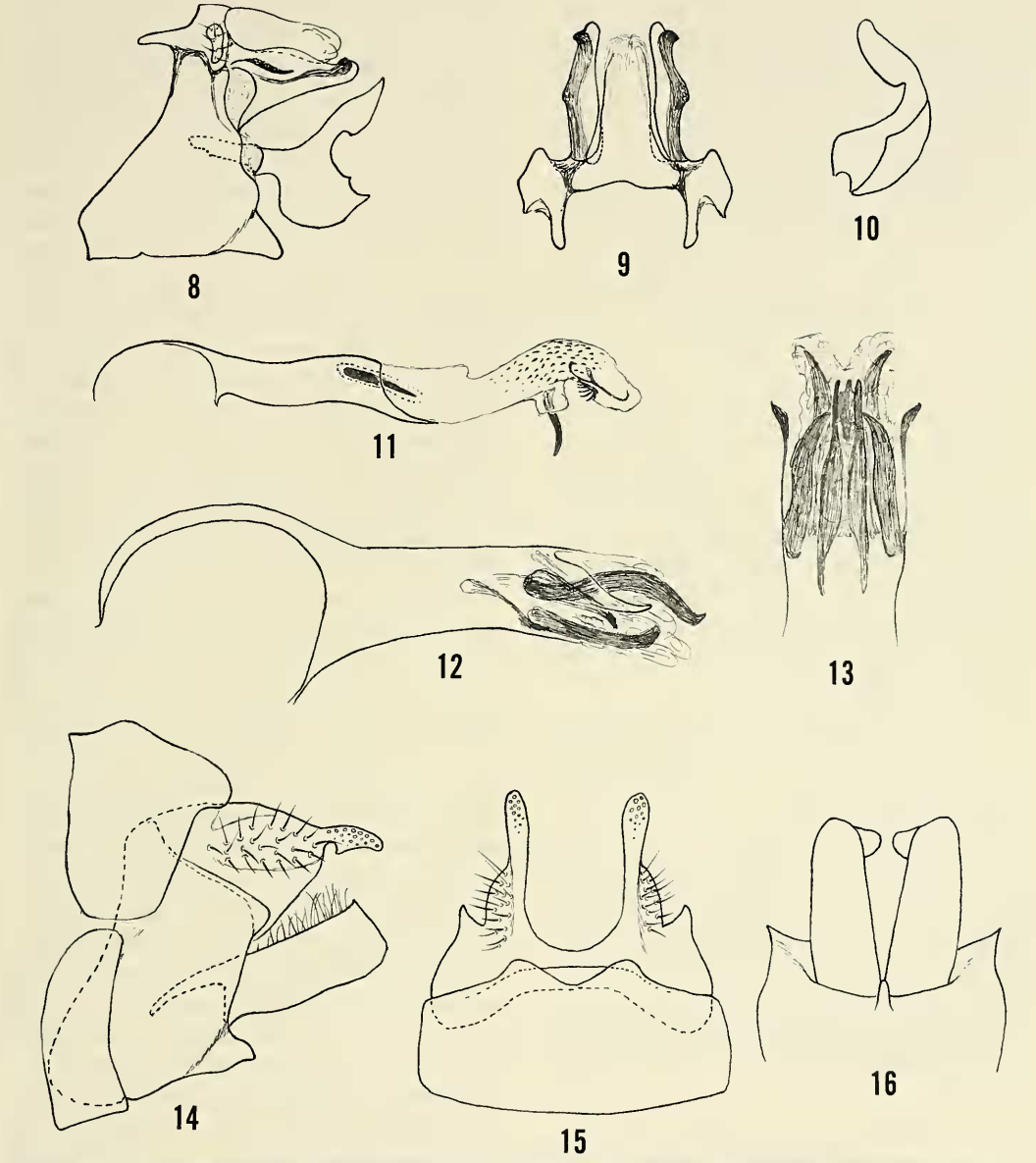
Family Philopotamidae

Chimarra (*Chimarra*) *dolabrifera*, new species

Figs. 8–11

This species is closely related to *C. platyrhina* Flint from Venezuela. It is recognized by differences in the tenth tergites and claspers of the male genitalia. The tenth tergite in *C. platyrhina* is slightly upturned apically in lateral aspect and only slightly expanded in dorsal aspect; in *C. dolabrifera* the tergite is straight apically with a distinct dark projection subapically which in dorsal aspect is seen to be a sharp point directed laterad. The clasper of *C. dolabrifera* in posterior aspect has its dorsal process developed into a distinct mesal lobe which in *C. platyrhina* is totally lacking.

Adult.—Length of forewing, 4.5 mm. Color overall fuscous, unicolorous; legs basally a bit paler. Forewing with a bulla on Rs; hindwing with 4 branches to Rs and 3 to M. Male genitalia: Ninth segment with anterior margin produced ventrolaterally, with a short dorsolateral process; posteroventral process triangular in outline, about as long as wide basally. Tenth tergum with a pair of elongate mesal plates, most heavily sclerotized along dorsal margin; lateral plate elongate, tapering apicad with a midlateral more strongly sclerotized ridge ending in a dark knob subapically, in dorsal aspect this knob is produced as a sharp laterally-di-



Figs. 8–16. Male genitalia of *Chimarra*. 8–11, *C. dolabrifera*: 8, lateral; 9, ninth and tenth terga, dorsal; 10, clasper, posterior; 11, phallus with endotheca everted, lateral. 12–16, *C. otuzcoensis*: 12, phallus, lateral; 13, apex of phallus, dorsal; 14, lateral; 15, eighth, ninth and tenth terga, dorsal; 16, ninth sternum and claspers, ventral.

rected point and the ridge expanded at midlength. Clasper with a broad, scooplike ventral portion and an apicodorsal process elongate and narrow in lateral aspect, but bearing a distinct mesal expansion in posterior aspect. Phallus with an apicoventral spine, a pair of subequal internal spines, a slender rod and ring assembly, and a dark spiculate pouch with a small sclerite bearing a cluster of small spines.

Material.—Holotype, male: Ecuador, Prov. Pichincha, Río Palenque Biological Station, 47 km S Santo Domingo de los Colorados, 750 m, 29 Jul 1976, J. Cohen, NMNH. Paratypes: Same data, 3 ♂; same, but 14 km E Santo Domingo de los Colorados, 5 Jul 1975, Langley & Cohen, 2 ♂; same, but 29 km W Santo Domingo de los Colorados, 6 May 1975, P. J. Spangler, 1 ♂. Prov. Los Ríos, Río Palenque Biological Station, 56 km N Quevedo, 220 m, 7 Jan 1978, P. J. Spangler, 1 ♂. Prov. Cotopaxi, 133 km W Latacunga, 1080 ft [327 m], 2 Jul 1975, Langley & Cohen, 6 ♂. Prov. Esmeraldas, La Union, 3 Feb 1979, J. J. Anderson, 1 ♂. Peru, Dept. La Libertad, Prov. Trujillo, Dist. Simbal, Río Lucumar, Simbal, 17 Jun 1988, L. Reyes A., 9 ♂, 3 ♀; same, but Río Lucumar-Cumbray Creek, 430 m, 10 Mar 1987, 6 ♂, 3 ♀; same, but 5 Sep 1987, 10 ♂, 4 ♀. Dist. Moche, Río Moche near Puente Moche, 12 Dec 1988, 1 ♂.

Chimarra (*Chimarra*) *emima* Ross

Chimarra (*Chimarra*) *emima* Ross, 1959: 172.—Flint, 1991.

The species was originally described from Panama, and since recorded from Nicaragua, Costa Rica, Colombia and Ecuador. This is the first record of the species from Peru.

Material.—Peru, Dept. Lambayeque, Río Saña, Oyotún, 200 m, 18 Nov 1989, L. Reyes A.,1 ♂, 1 ♀.

Chimarra (*Curgia*) *otuzcoensis,* new species
Figs. 12–16

Within the New World species of *Chimarra* this species is placeable no further than to subgenus. The genitalia offer two previously unknown character states: the cercus is at first sight lost, but it would appear to have completely fused with the lateral surface of the tenth tergum and to be represented by a distinctly setate area, and, secondly, the tenth tergum is deeply divided mid-dorsally with the lateral portions narrow and rodlike. The armature internally at the apex of the phallus is also very different from anything seen in congeneric species.

Adult.—Length of forewing, 7–8.5 mm. Color overall jet black, immaculate. Forewing without bulla in the radial system; hindwing with 4 branches to Rs and 3 to M. Male genitalia: Eighth sternum narrow, parallel-sided, posterior margin concave; tergum produced posteriad into a pair of rounded, submesal lobes. Ninth segment produced into a rounded anteroventral lobe; with a small posteromesal keel; posterolateral margin slightly produced and angulate at midlength. Cercus apparently completely fused to lateral surface of tenth tergum, apparent only as a setate area. Tenth tergum in lateral aspect broad basally, produced into an apical, noselike lobe with many sensillae; in dorsal aspect with a deep, U-shaped, mesal excision separating lateral arms. Clasper elongate, rectanguloid with a small apicodorsal point in lateral aspect, in ventral aspect with an apicomesal lobe from dorsal margin. Phallus tubular, inflated basally; apex with a thin, pointed process from dorsolateral surface on each side; a pair of long, arched, black spines dorsally, and a shorter pair of black spines laterally; midventrally with a large, black spine whose apex is trifid in ventral aspect and which bears a pair of slender basal processes.

Material.—Holotype, male: Peru, Dept. La Libertad, Prov. Otuzco, Dist. Sinsicap, Río Sinsicap, Sinsicap, 2000 m, 23 Sep 1989, L. Reyes A., NMNH. Paratypes: Same data, 15 ♂, 3 ♀.

Family Polycentropodidae

Polycentropus joergenseni Ulmer

Polycentropus Jörgenseni Ulmer, 1909:75.—Fischer, 1962:83.—Weidner, 1964:91.
Polycentropus colombiensis Banks, 1910:

160.—Fischer, 1962:67.—Flint, 1967:6 (new synonymy).

Polycentropus anomalus Navas, 1923: 201.—Fischer, 1962:66 (new synonymy).

This species is very widely distributed along the Andes Mountains of western South America. Examples have been seen from Argentina, Bolivia, Colombia, Ecuador and Venezuela; Peru is here added to the list.

The types of all three names have been studied by Flint. The male lectotype from Pedregal, Argentina, is in the Zoologische Staatsinstitut und Zoologisches Museum, Hamburg, Germany. A male syntype, bearing a Navas "Typus" label (and hereby designated the lectotype), of *P. anomalus* Navas from "La Granja (Alta Gracia) Prov. de Cordoba 1–8.IV.1920 C. Bruch" is in the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia," Buenos Aires, Argentina. The female holotype of *P. colombiensis* Banks, temporarily at the National Museum of Natural History, is property of the Museum of Comparative Zoology, Cambridge, Massachusetts. The genitalia of the lectotype of *P. anomalus* has been cleared and found to agree with that of *P. joergenseni* from western Argentina. The *P. colombiensis* female type also has been cleared and its genitalia compared with females associated with males of *P. joergenseni* from several different regions, and all found in agreement.

Material.—Peru, Dept. La Libertad, Prov. Otuzco, Dist. Sinsicap, Río Sinsicap, Sinsicap, 2000 m, 23 Sep 1989, L. Reyes A., 2 ♂, 2 ♀, 5 larvae, 2 pupae, 5 ♀ metamorphotypes.

Family Hydropsychidae

Smicridea (*Smicridea*) *bivittata* (Hagen)

Hydropsyche bivittata Hagen, 1861:291.

Smicridea (*Smicridea*) *bivittata* (Hagen).—Fischer, 1963:131; 1972:144.—Flint, 1974b:16; 1981:22.

This is a common, widespread species from Mexico south to Ecuador, and eastwardly across northern South America to Suriname; this is the first known record from Peru.

Material.—Peru, Dept. Lambayeque, Río Saña, Saña, 5 Nov 1989, L. Reyes A., 1 ♂.

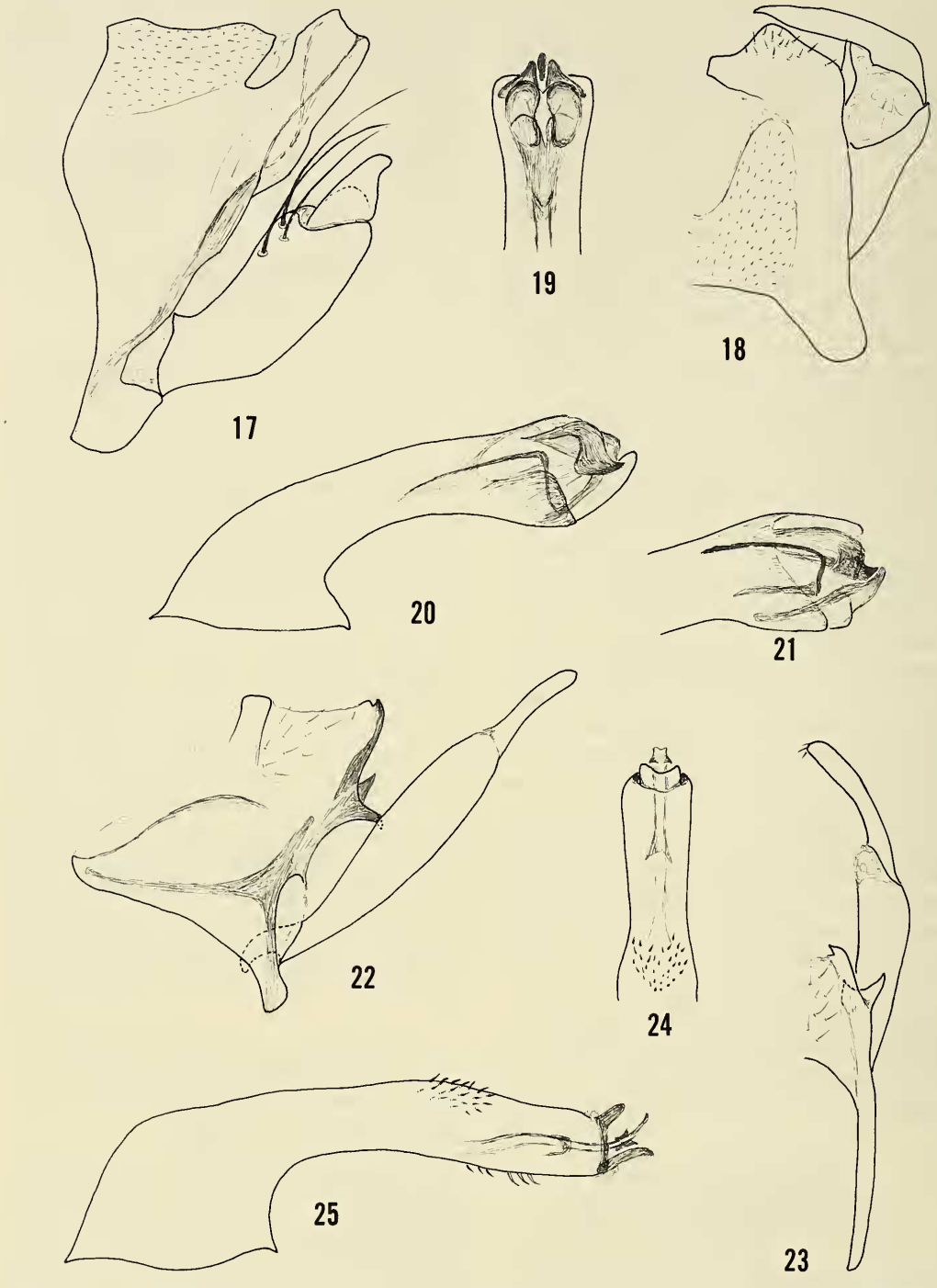
Smicridea (*Smicridea*) *saucia* McLachlan
Figs. 17–21

Smicridea saucia McLachlan, 1871:137.—Kimmins, 1957:106.—Fischer, 1963:134.

This species was originally described in 1871 from Peru "probably in the neighborhood of Lima," but has not been collected since. It is, therefore, with a great deal of pleasure that we record it again from Peru. Many years ago Flint borrowed the lectotype and 3 paralectotypes from the British Museum (Natural History), preparing drawings from them which are here published so that future workers may recognize the species. The examples from Trujillo Province are in complete agreement with the lectotype. However, the series from Otuzco are 1–2 mm larger (forewing length 6–7 mm as opposed to ca. 5 mm), and the sclerites at the tip of the phallus seem a bit different (Fig. 21). However, considering the overall similarity and lack of additional collections, they are considered conspecific for now.

The coloration of these fresh specimens are almost uniformly fuscous, with unmarked wings, the legs, however, are testaceous toward their bases.

Material.—Peru, Dept. La Libertad, Prov. Trujillo, Dist. Simbal, Río Lucumar-Cumbray Creek, 27 Jun 1988, L. Reyes A., 1 ♀; 14 May 1989, 1 ♀; 21 May 1989, 1 ♂. Río Lucumar, Simbal, 8 Dec 1988, 1 ♀; 5 Sep 1989, 14 ♂, 6 ♀. Prov. Otuzco, Dist. Sinsicap, Río Sinsicap, Sinsicap, 2000 m, 23 Sep 1989, L. Reyes A., 9 ♂, 3 ♀.



Figs. 17–25. Male genitalia of *Smicridea*. 17–21, *S. saucia*: 17, lateral; 18, ninth and tenth terga and clasper, dorsal; 19, apex of phallus, dorsal; 20, phallus, lateral; 21, apex of phallus of specimen from Otuzco, lateral. 22–25, *S. bidactyla*: 22, lateral; 23, ninth and tenth terga and clasper, dorsal; 24, apex of phallus, dorsal; 25, phallus, lateral.

Smicridea (*Rhyacophylax*) *murina* McLachlan

Smicridea murina McLachlan, 1871:137.—Fischer, 1963:134.
Smicridea (*Rhyacophylax*) *murina* McLachlan.—Flint, 1988:33.

This widespread species has an extensive synonymy (Fischer 1963, Flint 1988). It is known from Nicaragua in Central America south along western South America to central Chile. Although it is frequently found in wet, forested areas in Central America, it is equally at home in drier sites in waters open to the sun, perhaps explaining its success. Larvae and a female metamorphotype, probably of this species, have been taken in the Río Lucumar.

Material.—Peru, Dept. La Libertad, Prov. Trujillo, Dist. Simbal, Río Lucumar, Simbal, 11 Dec 1987, L. Reyes A., 2 ♂; same, but Río Lucumar-Cumbray Creek, 430 m, 2 Jul 1987, 1 ♂; 23 Aug 1987, 2 ♂. Dist. Moche, Río Moche at Puente Moche, 27 Jul 1988, 8 ♂. Dept. Lambayeque, Río Saña, Saña near the ruins of Corbacho, 30 Sep 1989, 4 ♂.

Smicridea (*Rhyacophylax*) *bidactyla,* new species
Figs. 22–25

This distinctive species is a member of the *signata* group, closest to *S. signata* (Banks) itself, with which it shares the bilobed apicodorsal plate and ventral tonguelike lobe on the phallus. It differs in possessing a small apicodorsal point and large bifid ventrolateral process on the tenth tergum and lacking the lateral process on the phallus, but possessing a dorsal area and a midventral row of spinules in the same general phallic region. The examples from Venezuela differ in lacking the dorsal patch of spines on the phallus and having only a single strong process from the ventrolateral margin of the tenth tergum. It is expected that these examples will prove to be only a variation in the species.

Adult.—Length of forewing, 4–5 mm. Eye of male slightly enlarged, width middorsally ½ that of interocular distance. Color overall pale stramineous; forewing with faint dark marks along chord and over thyridial nygma, with a paler subterminal band. Anterolateral processes of fifth sternum of male nearly twice as long as sternum; without internal sacs. Male genitalia: Ninth segment with anterolateral margin produced into an angulate lobe, with a strong dorsolateral line. Tenth tergum membranous dorsomedially, apex sharply upturned and produced into a small point; ventrolateral margin strongly sclerotized, produced into an elongate, posterolaterally directed process bearing a shorter, mesally directed branch. Clasper with basal segment long, slightly inflated; apical segment with tip obliquely rounded in dorsal aspect. Phallus tubular, basal and apical sections meeting at nearly 90°; with a dorsolateral, saddle-shaped area of spines and midventral row of spines subapically; apex with a semierect, dorsal, bilobed plate and a narrow, ventral, tonguelike lobe; internal sclerite threadlike, slightly sinuous.

Material.—Holotype, male: Ecuador, Prov. El Oro, 6 km E Pasaje, 13 Jan 1978, P. J. Spangler & J. Anderson, NMNH. Paratypes: Same data, 22 ♂, 4 ♀. Río La Calera, Piñas/Zaruma, 19–20 Aug 1977, L. E. Peña G., 1 ♂, 1 ♀. Victoria/Arenillas, 18–19 Aug 1977, L. E. Peña G., 3 ♂, 30 ♀. Prov. Loja, Macara, 13 Aug 1977, L. E. Peña G., 10 ♂, 2 ♀. Río Puyango, 300 m, 17–18 Aug 1977, L. E. Peña, G., 11 ♂. Prov. Los Ríos, 11 km S Quevedo, 3 Jul 1975, Langley & Cohen, 3 ♂, 10 ♀. Prov. Pichincha, 29 km W Santo Domingo de los Colorados, 6 May 1975, Spangler et al., 7 ♂, 3 ♀. Peru, Dept. Lambayeque, Río Saña, near ruins of Corbacho, 30 Sep 1989, L. Reyes A., 4 ♂, 2 ♀. Other: Venezuela, Edo. Barinas, Río Santo Domingo, Barinas, 17 Feb 1976, C. M. & O. S. Flint, Jr., 2 ♂, 5 ♀.

Family Hydroptilidae

Zumatrichia palmara Flint

Zumatrichia palmara Flint, 1970:22.

The species was originally described from El Salvador and Costa Rica, but the collection at the NMNH now contains additional examples from Panama and Ecuador. This record marks the southernmost known point in distribution of both the species and genus.

Material.—Peru, Dept. La Libertad, Prov. Trujillo, Dist. Simbal, Río Lucumar-Cumbray Creek, 25 Jul 1987, L. Reyes A., 1 ♂, 1 ♀; 14 May 1989, 1 ♂; same, but Río Lucumar, El Cholocar, 430 m, 23 Aug 1987, 2 ♂, 1 ♀; same, but Río Lucumar, Simbal, 24 Jun 1988, 1 ♂, 6 ♀; 22 Jul 1989, 2 ♂; 3 Aug 1989, 4 ♀; 15 Apr 1988, 1 ♂; 3 Aug 1988, 4 ♀. Dept. Lambayeque, Río Saña, Saña near the ruins of Corbacho, 30 Sep 1989, 5 ♂, 7 ♀.

Hydroptila constricta Bueno

Hydroptila constricta Bueno, 1984:99.

This species was recently described from Belize, Honduras and Mexico; however, it has more recently been collected in Colombia and Costa Rica. It, too, would appear to have a wide distribution in Central America and northwestern South America. Females associated with males of this species in Colombia are quite different from those recorded as species A and B, below, and agree with the females here recorded.

Material.—Peru, Dept. La Libertad, Prov. Otuzco, Dist. Sinsicap, Río Sinsicap, Sinsicap, 2000 m, 23 Sep 1989, L. Reyes A., 2 ♂, 24 ♀. Dist. Simbal, Río Lucumar, Cumbray, 19 Nov 1988, L. Reyes A., 1 ♂.

Hydroptila ditalea Flint

Hydroptila ditalea Flint, 1968:46.—Bueno, 1984:119.

The species originally was described from the island of Jamaica and subsequently recorded from coastal Mexico. These examples from Peru, and others from Ecuador in the collection of the NMNH, agree with the type and the Mexican examples, except that the twisted tip of the phallic rod differs slightly between the two regions. This tip in the southern region is a bit broader and more sharply angled than the examples from the north where it is quite delicate and strongly curved.

Material.—Peru, Dept. La Libertad, Prov. Trujillo, Dist. Simbal, Río Lucumar, Simbal, 24 Jun 1988, L. Reyes A., 4 ♂, 6 Jul 1989, 4 ♂; 22 Jul 1989, 1 ♂. Dist. Moche, Río Moche at Puente Moche, 3 Jul 1988, 2 ♂; 27 Jul 1988, 7 ♂; 14 Jan 1989, 1 ♂; 18 Jul 1989, 11 ♂; 16 Sep 1989, 15 ♂. Dist. Laredo, Río Moche, Conache, 28 Jul 1989, 3 ♂. Dept. Lambayeque, Río Saña, Saña near the ruins of Corbacho, 30 Sep 1989, 4 ♂.

Hydroptila grenadensis Flint

Hydroptila grenadensis Flint, 1968b:58.

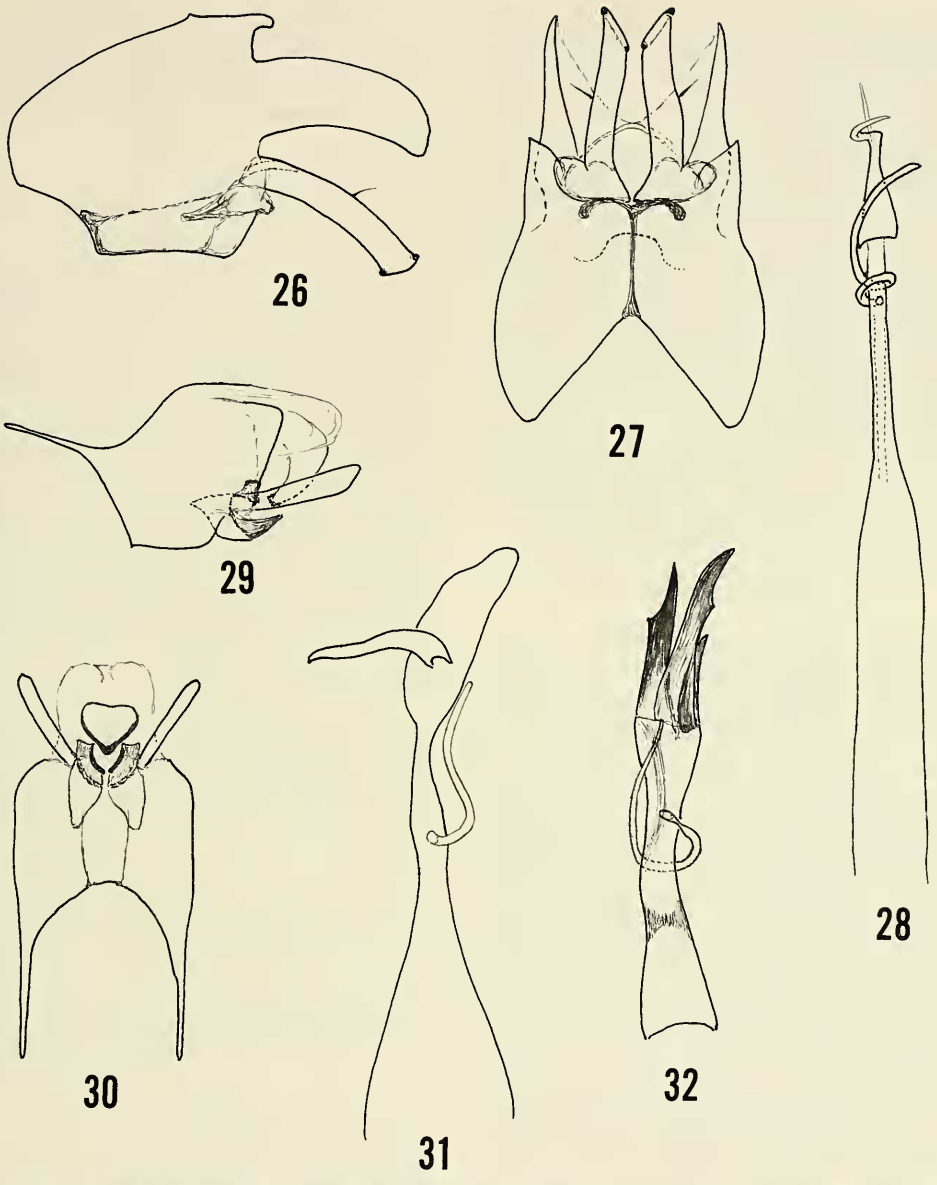
Although this species has only been recorded from the island of Grenada, it is apparently widespread across northern South America and southern Central America. There is material from Trinidad, Colombia, Panama, and Ecuador in the collection of the NMNH.

Material.—Peru, Dept. La Libertad, Prov. Trujillo, Dist. Simbal, Río Lucumar, Simbal, 9 Jul 1988, L. Reyes A., 1 ♂; same, but Río Lucumar-Cumbray Creek, 21 May 1989, 1 ♂. Dept. Lambayeque, Río Saña, Saña, 5 Nov 1989, 1 ♂; same, but near the ruins of Corbacho, 30 Sep 1989, 2 ♂.

Hydroptila sicilicula, new species

Figs. 26–28

This species appears very similar to *H. brailovskyi* Bueno on the basis of the slender claspers and general appearance of the phallus. However, in *H. sicilicula* there is no process posterolaterally from the ninth segment and it is produced apicodorsally, the



Figs. 26–32. Male genitalia of *Hydroptila* and *Neotrichia*. 26–28, *H. sicilicula*: 26, lateral; 27, ventral; 28, phallus. 29–31, *N. riparia*: 29, lateral; 30, ventral; 31, phallus. 32, *N. gotera*, phallus.

tenth tergum is deeply divided mesally and broader and more decurved in lateral aspect, and the claspers end in both dorsal and ventral spots and its tip is slightly rolled laterad. In *H. brailovskyi* the clasper is slightly produced apicodorsally with the only dark spot borne here, and the tip is not rolled laterad.

Adult.—Length of forewing, 2.5 mm. Cleared, in alcohol: pale brown in color. Ninth segment with anterior margin rounded, ventrolateral margin concave; apicodorsally produced into a strong, projecting lobe, semicircular in dorsal aspect; lacking posterolateral spur. Tenth tergum deeply divided dorsomesally, membranous; ventro-

lateral margins lightly sclerotized, broad and slightly decurved in lateral aspect. Subgenital plate rather indistinct in ventral aspect, apparently rounded apically. Clasper in lateral aspect slightly curved, of uniform width, tip slightly rolled laterad with distinct apicodorsal and ventral dark points. Phallus with apical portion less than ¼ length of basal portion; with a well developed spiral process; apical portion inflated basally, tapering apicad, apex twisted into a laterally directed process, central tubule extending slightly beyond process.

Material.—Holotype, male: Peru, Dept. Lambayeque, Río Saña, Saña near the ruins of Corbacho, 30 Sep 1989, L. Reyes A., NMNH. Paratypes: Same data, 4 ♂.

Hydroptila species

Although females were taken with many of the collections of male *Hydroptila ditalea* and *H. grenadensis* as listed above, there is a major problem in the association of the sexes. Females were figured when both of the above species were described; there is no apparent difference in their eighth segments as figured. The same form of female (termed A, below) is common in Peru. There is also a female with a very different eighth segment (termed B). Because there is no way to know which female goes with which species, and that it is possible that both *H. ditalea* and *H. grenadensis* may be mixed under type A and type B may represent yet another species, all females are listed below.

Material.—Type A: Peru, Dept. La Libertad, Prov. Trujillo, Dist. Simbal, Río Lucumar, Simbal, 24 Jun 1988, L. Reyes A., 1 ♀; 9 Dec 1988, 1 ♀; 6 Jul 1989, 2 ♀; 22 Jul 1989, 4 ♀; same, but Río Lucumar-Cumbray Creek, 19 Nov 1989, 1 ♀. Dist. Moche, Río Moche at Puente Moche, 3 Jul 1988, 3 ♀; 27 Jul 1988, 1 ♀; 14 Jan 1989, 1 ♀; 18 Jul 1989, 5 ♀; 16 Sep 1989, 10 ♀. Dist. Laredo, Río Moche, Conache, 28 Jul 1989, 1 ♀. Dept. Lambayeque, Río Saña, Saña near the ruins of Corbacho, 30 Sep 1989, 7 ♀.

Type B: Peru, Dept. La Libertad, Prov. Trujillo, Dist. Simbal, Río Lucumar, Simbal, 24 Jun 1988, L. Reyes A., 5 ♀; same, but Río Lucumar-Cumbray Creek, 19 Nov 1989, 2 ♀.

Neotrichia riparia, new species
Figs. 29–31

This distinctive species is a member of the "*Exitrichia*" group of species, similar to as *N. eroga* (Mosely) and, especially, *N. palma* Flint. It differs from other members of the group in lacking any sclerotized dorsolateral projection from the ninth segment and in possessing a decurved, dark-tipped subgenital plate. It is especially similar to *N. palma* in these characteristics, but differs from the latter in having short claspers, in the position of the anterolateral process of the ninth segment, and in having a single spine from the phallus.

Adult.—Length of forewing, 2 mm. Color in alcohol, grayish-brown, wings mottled. Ninth segment with anterolateral process long, slender, at mid-height of segment. Tenth tergum membranous. Subgenital plate developed as a long, dark-tipped, curved process, ending between clasper bases. Bracteole very lightly sclerotized, semierect, parallel-sided. Clasper shorter than bracteole, slightly angled and pointed in lateral aspect, in ventral aspect truncate apically and darkened mesally. Phallus with a spiral process, apex enlarged, with a single large spine which is often everted laterad.

Material.—Holotype, male: Peru, Dept. La Libertad, Prov. Trujillo, Dist. Simbal, Río Lucumar, Simbal, 24 Jun 1988, L. Reyes A., NMNH. Paratypes: Same data, 3 ♂; same, but 9 Dec 1988, 1 ♂, 4 ♀; same, but 22 Jul 1989, 1 ♂. Dist. Laredo, Río Moche, Conache, 28 Jul 1989, 1 ♂, 3 ♀. Dist. Moche, Río Moche at Puente Moche, 27 Jul 1988, 12 ♂, 12 ♀; 18 Jul 1989, 8 ♂, 15 ♀; 16 Sep 1989, 4 ♂, 2 ♀. Dept. Lambayeque, Río Saña, Saña, 5 Nov 1989, 4 ♂, 20 ♀; same, but near the ruins of Corbacho, 30 Sep 1989, 16 ♂, 12 ♀.

Neotrichia gotera Flint
Fig. 32

Neotrichia gotera Flint, 1983:51.

This species has been known previously only from the unique type from the Province of Salta, in northwestern Argentina. Its discovery in the coastal region of northern Peru represents a major range extension, and suggests that it may be very widespread over the drier areas of western South America.

The genitalia of the two examples are in very good agreement, with some variation. The apicolateral angles of the subgenital plate are drawn-out further in the Peruvian example than in the Argentinian. The major difference is in the spines at the tip of the phallus. The type only has a pair of spines, the Peruvian three (Fig. 32). However, I suspect that the third spine may be broken off the type as it has a large vacant space where the leftmost spine is seen in Fig. 32.

Material.—Peru, Dept. La Libertad, Prov. Otuzco, Dist. Sinsicap, Río Sinsicap, Sinsicap, 2000 m, 23 Sep 1989, L. Reyes A., 1 ♂.

Ochrotrichia (*O.*) *tenanga* Mosely

Polytrichia tenanga Mosely, 1937:185.
Ochrotrichia (*O.*) *tenanga* (Mosely).—Flint, 1972:8; 1981:29.

This is the most widespread Neotropical species of the genus, being recorded from Mexico, Guatemala, Honduras, Costa Rica, Panama, and Venezuela. Nevertheless, its discovery from as far south as northern Peru is somewhat of a surprise.

Material.—Peru, Dept. La Libertad, Prov. Trujillo, Dist. Simbal, Río Lucumar, Simbal, 9 Dec 1988, L. Reyes A., 1 ♂, 2 ♀; 24 Jun 1988, 2 ♂, 5 ♀; 9 Jul 1988, 1 ♂, 1 ♀; 12 Dec 1987, 1 ♀; 6 Jul 1989, 1 ♂, 1 ♀; 5 Sep 1989, 1 ♀. Dist Moche, Río Moche at Puente Moche, 16 Sep 1989, 1 ♂.

Ochrotrichia (*Metrichia*) *malada* Flint

Ochrotrichia (*Metrichia*) *malada* Flint, 1991: 455.

This species, described in a paper on the Trichoptera of the Department of Antioquia, Colombia, is here recorded from Peru. There is close agreement between the type and this example in the structures of the abdomen, but a number of small differences in the genitalia. In the Peruvian example the apicoventral angle of the clasper protrudes slightly, rather than recedes, and the dorsolateral hook is shorter and not bent laterad subapically.

Material.—Peru, Dept. La Libertad, Prov. Otuzco, Dist. Sinsicap, Río Sinsicap, Sinsicap, 2000 m, 23 Sep 1989, L. Reyes A., 1 ♂.

Oxyethira parce (Edwards & Arnold)

Protoptila parce Edwards & Arnold, 1961: 405.—Edwards, 1973:496.

This species was erroneously synonymized by Flint (1981) with *Oxyethira azteca* (Mosely). During the preparation of this paper it was discovered that two very closely related species have been confused under the name of *O. azteca.* What is judged to be the true *O. azteca,* based on the original excellent illustrations of Mosely, is not as widely distributed as the closely related *O. parce,* although both have exceedingly wide distributions. Several collections from Venezuela and Colombia even contain the two species taken together.

Figures (33–43) showing the differences in the male and female genitalia of the two species are given here. In the male the differences are to be most clearly seen in the complex of ninth segment-inferior appendages-subgenital plate-bilobed process. In *O. azteca* in lateral aspect (Fig. 33) the dorsal process of ninth segment-inferior appendages lobe is almost at midlength, whereas in *O. parce* it is barely more than a third of

the length of the lobe (Fig. 39); the bilobed process is more strongly arched and much shorter in *O. azteca* than in *O. parce* in which the bilobed process is longer and more closely appressed to the dorsolateral margins of the subgenital plate. In dorsal aspect (Fig. 41) the basalmost extension of the bilobed process in *O. parce* reaches a bit more than half the distance from the dorsal process to the base of the ninth segment whereas in *O. azteca* it extends only about one-third of this distance (Fig. 36). The apicoventral lip of the phallus in *O. parce* is much longer than in *O. azteca* (Figs. 40 and 34). In the female vaginal sclerites there is, in *O. parce,* an erect process at the base of the lightly sclerotized basal sac (Fig. 42) which is lacking in *O. azteca* (Fig. 37). The latter has a decumbent lobe arising more apicad which might be confused with these processes. There are other differences in the vaginal sclerites, but their appearance varies very strongly with the degree of pigmentation of the parts.

Material.—Peru, Dept. La Libertad, Prov. Trujillo, Dist. Simbal, Río Lucumar, Simbal, 12 Dec 1987, L. Reyes A., 2 ♂; 24 Jun 1988, 1 ♀; 9 July 1988, 1 ♂; same, but Río Lucumar-Cumbray Creek, 19 Nov 1988, 1 ♂, 2 ♀. Dist. Moche, Río Moche at Puente Moche, 14 Jan 1989, 2 ♂; 18 Jul 1989, 12 ♂, 4 ♀; 16 Sep 1989, 19 ♂, 11 ♀.

Family Leptoceridae

Nectopsyche spiloma (Ross)

Leptocella spiloma Ross, 1944:219.
Nectopsyche spiloma (Ross).—Haddock, 1977:392.

This species was originally described from Kansas in the United States, but subsequently recorded from Guatemala, Honduras, Mexico, Nicaragua and Panama. Additional material has been seen from Costa Rica and Ecuador, and now its presence in northern Peru is noted. This range is almost as great as than of *N. punctata,* listed below, but extends more to the north than does *N. punctata* which is much more widespread in South America.

Material.—Peru, Dept. La Libertad, Prov. Trujillo, Dist. Simbal, Simbal (village), 15 Apr 1988, L. Reyes A., 2 ♂; same, but Río Lucumar, Simbal, 24 Jun 1988, 3 ♀; same, but Río Lucumar-Cumbray Creek, 12 May 1987, 1 ♂; 25 Jul 1987, 1 ♂; 12 May 1989, 1 ♂; 21 May 1989, 3 ♂; same, but Río Lucumar, Cholocar, 17 Sep 1989, 2 ♂. Dist. Laredo, Río Moche, Conache, 28 Jul 1989, 7 ♂. Dist. Moche, Río Moche at Puente Moche, 27 Jun 1988, 1 ♂, 3 ♀; 16 Sep 1989, 5 ♂, 2 ♀.

Nectopsyche punctata (Ulmer)

Leptocella punctata Ulmer, 1905:75.—Fischer, 1966:60.
Nectopsyche punctata (Ulmer).—Flint, 1981: 34.

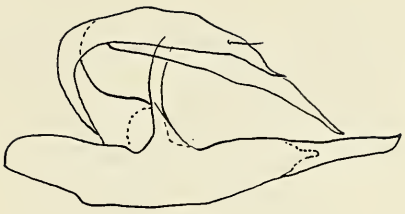
This species is very widely distributed in the neotropics, being known from central Mexico south to central Argentina, in both lowland and upland areas. The color pattern on the wings varies considerably in different areas, resulting in considerable synonymy (Fischer 1966, Flint 1981). The species apparently has not been recorded from Peru before, although material from the Departments of Cusco, Huanuco, Junín, Lima, Loreto, Madre de Dios and Pasco has been seen by Flint.

Material.—Peru, Dept. La Libertad, Prov. Trujillo, Dist. Moche, Río Moche at Puente Moche, 27 Jun 1988, Luis Gil, 1 ♂; same, but 16 Sep 1989, L. Reyes A., 6 ♂. Dept. Lambayeque, Río Saña, Oyotún, 200 m, 18 Nov 1989, 1 ♂, 1 ♀.

Triaenodes peruanus, new species
Figs. 44–46

Although three species of *Triaenodes* have been described from the neotropics, *T. columbica* Ulmer is totally unlike the other known Neotropical species and its genitalia

33



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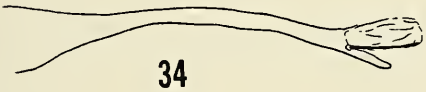

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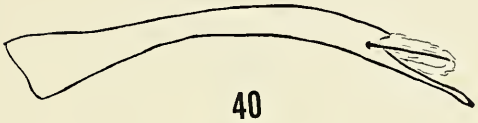

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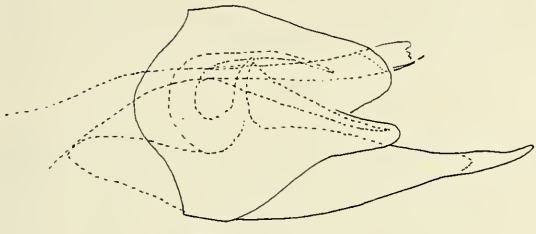

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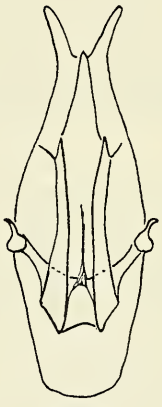

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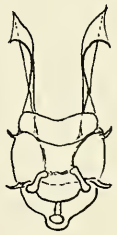
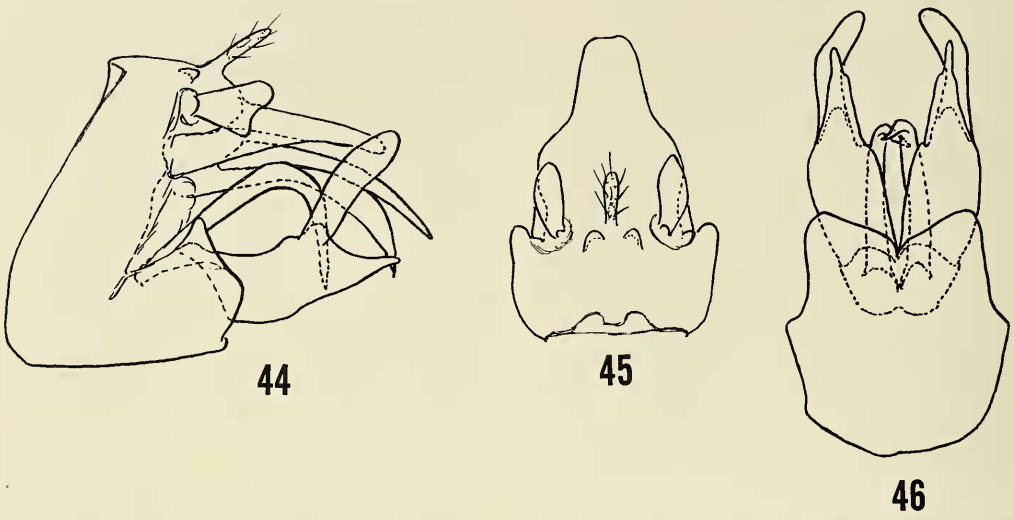


38 43

Figs. 33–43. Genitalia of *Oxyethira*. 33–38, *O. azteca*: 33, male ninth segment and beyond, lateral; 34, phallus, lateral; 35, male genitalia, lateral; 36, male ninth segment and beyond dorsal; 37, female vaginal sclerites, lateral; 38, same, dorsal. 39–43, *O. parce*: 39, male ninth segment and beyond, lateral; 40, phallus, lateral; 41, male ninth segment and beyond, dorsal; 42, female vaginal sclerites, lateral; 43, same, dorsal.



Figs. 44–46. Male genitalia of *Triaenodes peruanus*: 44, lateral; 45, ninth and tenth terga and cerci, dorsal; 46, ninth sternum and claspers, ventral.

seem more similar to certain African groups (K. Manuel, pers. comm.) suggesting a mislabeled type. The Costa Rican species, *T. delicatus* Navas, is quite similar to *T. peruanus* in its genitalia and coloration. However, in *T. delicatus* the mid-dorsal process of the ninth tergum is longer, the cercus is barely widened apicad, the apex of the tenth tergum is drawn out into a narrow point, and the phallic parameres are longer with a lateral point at midlength.

Adult.—Length of forewing, male 4.5–5 mm, female 5.5–7 mm. Color overall tawny, immaculate; appendages, head and thorax dorsally paler; forewing tawny. Male genitalia: Ninth segment slightly expanded anteroventrally, with an erect middorsal process and low dorsolateral knobs. Cercus short, expanded apicad, apical margin slightly bilobate in lateral aspect. Tenth tergum elongate, tapered apicad, apex rounded. Clasper with a basodorsal process whose apical half is sharply angled ventrad; with a thin, pale dorsolateral lobe of uniform width; apical lobe tapering to a point. Phallus with a long mesoventral sclerite and paired dorsolateral parameres of same length as mesoventral sclerite.

Material.—Holotype, male: Peru, Dept. La Libertad, Prov. Trujillo, Dist. Simbal, Río Lucumar, Simbal, 9 Jul 1988, L. Reyes A., NMNH. Paratypes: Same data, 1 ♂, 4 ♀; same, but 3 Aug 1988, 2 ♀; same, but 24 Jun 1988, 1 ♂, 1 ♀; same, but 5 Sep 1989, 1 ♂.

Family Helicopsychidae

Helicopsyche vergelana Ross

Helicopsyche vergelana Ross, 1956:440.—Flint, 1981:37.

This species is widely distributed in the northern neotropics: Mexico through Central America, east to Suriname, and now south to northern Peru.

Material.—Peru, Dept. La Libertad, Prov. Trujillo, Dist. Simbal, Río Lucumar, Simbal, 12 Dec 1987, L. Reyes A., 6 ♂, 1 ♀; 12 Oct 1987, 3 ♂; same, but Río Lucumar-Cumbray Creek, 25 Jul 1987, 2 ♂, 2 ♀; 27 Jun 1988, 3 ♂, 1 ♀.

Acknowledgments

The authors express their appreciation to: Dr. P. O. Whalley of the British Museum

(Natural History) for the loan of the type of *Smicridea saucia* McLachlan; Mr. Young T. Sohn, Scientific Illustrator of the Department of Entomology, Smithsonian Institution, for the preparation of Fig. 7; and to the reviewers of this article for their very valuable criticisms.

Postscript

Shortly after Flint received the corrected copy of the major part of this manuscript from Reyes, he received notice that Biologo Luis Reyes Arrunategui died on April 18, 1990, in a traffic accident on his way to collect in the field. Reyes had just started a survey of the the Río Saña, Department of Lambayeque for his thesis to obtain the Bachelor of Biological Science degree. His first collection from this Río had been sent to Flint and the results of their study have been incorporated into this work as they add further insight into the caddisfly fauna of this poorly known region of the world.

The death of Lucho is a great shock to me. He was the most promising young man to begin the study of caddisflies in South America. Although greatly hampered by the lack of library and reference collection, he was an indefatigable collector and an avid student of these insects. I count myself lucky to have had a month in the field with him on the Biolat expedition to Pakitza in September of 1988.

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